RCE REPORT

SCAQ – Inadequate CAP Resolution of Significant Issues
Event Date: 1/26/2009

RCE01166830-01

CAP AR 01166830

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I. Executive Summary

Problem: The Corrective Action Program at Prairie Island has not consistently resolved significant issues resulting in decreased equipment reliability, operation transients and repeat non-compliance with station procedures and regulatory requirements.

Event Synopsis:

A Focused Self Assessment, documented in AR 1165841, was performed on the effectiveness of the Corrective Action Process. The Focused Self Assessment process discovered numerous examples of Prairie Island failing to consistently resolve significant issues. The Focused Self Assessment was used to develop the problem statement for this Root Cause Evaluation.

Conclusions:

Using root cause evaluation methods, including evaluation of the Corrective Action Process, the team concluded that the Corrective Action Process is not managed effectively. The team identified four significant contributing factors which are driving ineffective resolution of significant issues:

- Work load is greater than available resources.
- Prioritization of individual work load is less than adequate (due date driven). This included the fact that there are no common site priorities to help manage work load.
- Failure to follow procedure (FP-PA-ARP-01)
- Due date is what is measured and monitored, not quality

Nuclear Safety Significance:

Cross cutting investigations, self assessments and previous root causes have identified issues; however, the timeliness to resolve these issues has been less than adequate. Additionally, with over 1800 open action items there is a possibility that one or more of those open action items may pose a nuclear, radiological or personnel safety concern.

Root Cause:

- Root Cause – Management has failed to consistently enforce quality standards and set work priorities based upon procedural requirements and risk / benefit to the plant.
- Contributing Cause #1 – An integrated site priority matrix that interfaces with other high resource plant processes and programs does not exist.
- Contributing Cause #2 – There are no highly visible CAP process measures for quality.
- Contributing Cause #3 – Failure to perform all requirements within the procedure.

Corrective Action Synopsis:

- Develop and implement a CAP priority matrix similar or identical to the work order priority matrix.
- Develop and implement a Department CAP Health Indicator.
- Develop and implement a Site CAP resolution quality and timeliness Key Performance Indicator.
- Establish management expectations and accountability for CAP process implementation and timeliness of resolution.
- Revise FP-PA-ARP-01 to address identified issues and enhancements.

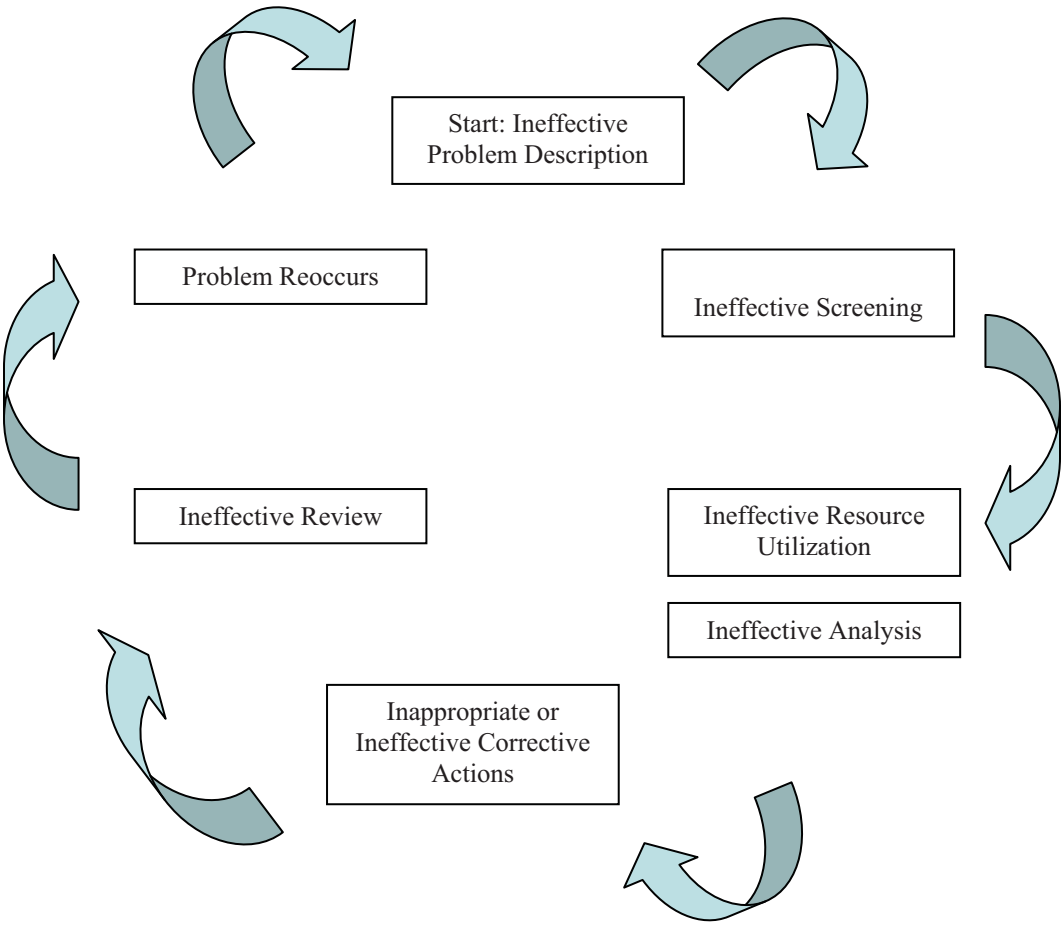
Reports to External Agencies:

No reports will be made to external agencies. The CAP identifying this issue was posted on the February 17, 2009 NSP Nuclear Department Internal OE Report. When the RCE is complete and approved by PARB a follow-up posting will be made.

II. Event Narrative

A Focused Self Assessment (FSA), documented in AR 1165841 (D38), was performed on the effectiveness of the Corrective Action Process (CAP). The FSA checklist, QF-0402, provides numerous examples in support of the problem statement for this Root Cause Evaluation (RCE): "The Corrective Action Program at Prairie Island has not consistently resolved significant issues resulting in decreased equipment reliability, operation transients and repeat non-compliance with station procedures and regulatory requirements."

What was observed during the evaluation and interview process was a cyclic problem within the identification and resolution process:



Other observations indicated that the site has a mindset that "if we meet due date and KPIs we are doing well (D27)." Other issues identified are procedure-driven. For example, managers and supervisors default to a due date of 30 days/120 days because a longer time requires prioritization, consideration of time required for "quality" resolution, and documentation of the justification. A successful process makes doing the right thing the path of least resistance.

The interview and evaluation process revealed that actions to address the CAP process shortfalls alone will not resolve the issues. A successful CAP process needs support and interaction with other site programs, integrated site priorities and management presence reinforcing standards and expectations.

III. Extent of Condition Assessment

The extent of condition is defined as the extent to which an identified problem has impacted other plant processes, equipment or human performance. The following areas were considered for extent of condition.

Environment – environment has been determined not to be a factor for this extent of condition.

Equipment – equipment has been determined not to be a factor for this extent of condition.

People – this condition applies to all site personnel, including contractors, who perform any aspect of the corrective action process.

Organization – this condition is not limited to a single department or organization. It applies to all Prairie Island departments.

Process – similar processes include work management, and engineering work management.

A search of the CAP database was performed to determine if past problems have been identified that are associated with the RCE problem statement. The search results were reviewed looking for ARs related to CAP process effectiveness and for safety culture as it applies to the corrective action process.

The following applicable CAPs were found:

- RCE 1117841, WANO AFI OR.2-2 (D9), Managers frequently do not hold personnel accountable for using established processes to achieve high levels of performance. Ineffective or noncompliant use of processes has contributed to insufficient resolution of equipment problems and to delays in addressing emergent issues. Insufficient leadership focus on developing trust and confidence in the value of using established processes contributes to these shortfalls.
- RCE 1141755 (D7), The NRC identified three issues which have been assigned a crosscut to the Evaluation/Extent aspect of the Corrective Action Program component: These three crosscutting issues are as follows:
    - TSC Ventilation configuration and functionality
    - SI-9-5 check valve testing deficiencies
    - 11 TD AFWP high bearing temperatures
- RCE 1165133 (D15), at the 4th Quarter NRC Exit, Prairie Island received notification of several additional actual and potential NRC violations, each

with cross-cutting aspects. Added to the existing NRC violations over the last 4 quarters, there are 3 separate cross-cutting aspects in the NRC Matrix with 3 violations in each aspect. They are in Work Practices – Oversight, Decision-making – Systematic Processes and Decision-making – Conservative Assumptions. The purpose of this root cause is to determine the cause of the Human Performance related NRC violations to occur in this quantity, creating the potential for a Substantive Cross-Cutting Issue finding by the NRC.

- Existing actions to address similar issues are contained in the site excellence plan within the CAP Gap and work management action plans that are intended to target and improve human performance with regards to meeting standards and expectations (i.e., understanding and following processes).

Results of Extent of Condition Assessment:

The evaluation of extent of condition has determined that similar issues have been identified and actions are in place to resolve each item. No additional actions are recommended to address other site processes.

Extent of Cause Assessment

The extent of cause analysis determines if the root causes of this problem have impacted other plant processes, equipment or human performance. Five distinct areas are considered for extent of cause:

- Environment – environment has been determined not to be a factor for this extent of condition.
- Equipment – equipment has been determined not to be a factor for this extent of condition.
- People – Do the causes impact other personnel (other than those involved) or other human performance issues?
- Organization – Do the causes impact other crews, departments or organizations?
- Process – Are there identical or similar processes or procedures that may be impacted by the causes?

The methods used are to compare in the following manner:

- Identical to Identical (same – same);
- Identical to Similar (same – similar);

Results of Extent of Cause Assessment:

The goal of the extent of cause assessment for the root cause was to determine if the program procedure does not describe the methods required to successfully perform the various aspects of the CAP process. The environment and equipment were determined to not be significant issues for this cause. The evaluation focused on people and processes.

It was determined that the causes identified are not limited to the CAP process. The discussion of Previous Similar Events illustrates how the existence of these and similar causes have led to significant problems at Prairie Island. It was determined that changes to the CAP process alone would not resolve this type of issues. Effective interface with other site processes and programs is required.

Overall, there were no significant conditions adverse to quality identified for the extent of this root cause.

IV. **Previous Similar Events**:

RCE01013473, D6 High Crankcase Pressure Resulting in Unit 2 Shutdown (D5) identified three Organizational Root Causes, in brief; inappropriate execution of the CAP program, current set of performance measures and reinforcement tools places a high importance on getting a task completed on time and less importance on the quality of the product, and no robust trending process. Review of the CAPRs and EFRs created reveal multiple failures to perform the actions, EFRs deemed as unsatisfactory in completion notes in Passport, but effective in EFR report [Attachment 10].

RCE 01085806, BKR 16-7, 12 SI Pump Breaker Inoperable (D6) identified a human performance failure in an error-prone process that was a longstanding work practice. Review of the CAPRs shows no corrective action developed to specifically address the organizational failures that allow this, and perhaps other, longstanding work practices.

RCE01099775, High Radiation Area, Locked High Radiation Area, and Very High Radiation Area Controls (D7) identified a root cause of weak enforcement and oversight of Radiation Protection rules and expectations have created a work environment that is more susceptible to radiological events. Review of CAPRs and EFR show failure to complete actions and questionable effectiveness [Attachment 10].

RCE01100615, CAPRs Closure Conflicts with Procedural Requirements (D8) identified previous attempts to resolve the issue have not been fully effective, with human performance failure modes including wrong assumptions, inadequate verifications, inadequate tracking and time and schedule pressure. From the report: “Corrective actions to directly address the HU failures were considered, but not implemented. Previous efforts to address the HU aspects were not successful.” The root cause cited wrong assumptions, inadequate verification and inadequate task management. The CAPR action cited to result in assurance that a plan exists to facilitate CAPR closure (a pre-planning meeting with requirement that owed to report the results) does not appear to have been proceduralized [Attachment 10].

RCE 01117841, WANO Peer Review AFI OR.2 (D9) states managers frequently do not hold personnel accountable for using established processes to achieve high levels of performance. The root cause identified was disciplined adherence to processes is not a site priority, with three contributing factors; managers have not effectively engaged the workforce to accomplish

site goals, priorities, or improvement initiatives, work groups do not clearly understand their roles and responsibilities and how to effectively work together to resolve issues, and managers have not set clear direction and priorities that are understood by the workforce, and have not aligned the organization to achieve common goals. This effort is ongoing, due April 2010.

RCE01141755-01, Identified NRC Crosscutting Issues (D7) concludes that the operational philosophy currently in place relies on skill sets and knowledge that no longer exist within the station and the organization is not placing appropriate focus on plant issues, strategies, and/or the appropriate priority when they are identified. The root cause identified is the roles and responsibilities previously held by Engineering to address plant issues have not been effectively transferred to Operations to promote a strong operational focus with contributing causes cited; high workload without proper prioritization and lack of critical skills throughout the organization. The created CAPRs, still in process, are to revise the ODMI procedure and train Operations and Engineering. CAs are in process to address the contributing causes. This effort is ongoing, due June 2010.

Results of Previous Similar Events Assessment:

The results of the previous similar events review and assessment validate the problem statement associated with this RCE: the corrective action program at Prairie Island has not consistently resolved significant issues.

V. **Operating Experience:**

Internal OE Assessment

A review of the July-December 2008 Site Drum Report (D20) for missed opportunities and Internal OE provided insight that some issues are recognized in the Site and Departmental DRUM reports.

The Site DRUM Report concluded “the station has communicated the vision for improved performance, but this has not been translated to improved individual contributor level performance. The execution of this vision may be attenuated by conflicting directions i.e. difficulty in prioritizing work activities.”

The Issues that were identified in the DRUM Report are:

- The work load combined with limited qualified resource availability fosters due date driven, shallow evaluation/work completion which results in rework. RCE interviews confirmed this (D27).
- The KPI for event clock reset rate does not align with input from others such as the NRC. The KPI describes station performance as exceeding expectations.
- The corrective action program overall health is adequate with significant opportunities for improvement, including management of CAP inventory (particularly by the Engineering department) and Root/Apparent Cause evaluation grades.

- Program challenges include addressing increasing CAP and CAP action inventory and addressing/evaluating issues with sufficient detail to eliminate ineffective and untimely corrective actions.
- Actions for previously identified trends are not completed. A FSA (D38) indicated 15 of the 20 AFIs were deemed to be off track.
- There were no new trends identified in this report; however there were three (3) outstanding trends from the previous report.

The Site Drum Report identified Actions to improve Human Performance. These actions include:

- Establish and promulgate management expectations for supervisory oversight of pre-job briefings.
- The 2009 Site HU Improvement Plan was developed during the fourth quarter. Individual Departments are designed to support the site plan.

Results of Internal OE Assessment

The RCE team came to the conclusion that individual departments recognize their issues and document them in the DRUM Reports, however, the effectiveness of resolution is not fully understood nor corrective actions completed (D20). Four (4) of the six (6) issues identified in the report align with and support the conclusion that the failure mode F6 (Inadequate Program Management) is a primary driver. This is consistent with the evaluations performed as a function of this RCE.

External OE Assessment

Based on the RCE Charter problem statement a search was made of the Institute of Nuclear Power Operations (INPO) OE Database using the following keywords: *safety culture and problem reporting* and Event Descriptor: *corrective action (PI)*. Results of the queries were reviewed for applicability to this RCE. The following summary from Harris was found to have a problem statement and causes closely related to this RCE.

OE27290 Harris identified that some important or longstanding problems related to organizational deficiencies are not driven to resolution through CAP implementation (D40).

ABSTRACT: In some cases, organizational aspects of problems are not adequately resolved through the corrective action program. Harris has failed to recognize opportunities for organizational learning. Evidence of missed learning opportunities exists in our performance indicator and system health reviews, our procedural guidance for investigation depth, and our oversight of self-evaluation.

CAUSES: The selected cause is that even though HNP has a bias for action, we are missing opportunities to learn. We need to identify typical situations that are indicative of a learning opportunity, to ask "how did we allow this to happen". Evidence of missed learning opportunities exists in our performance

indicator and system health reviews, our procedural guidance for investigation depth, and our oversight of self-evaluation.

Results of External OE Assessment

Review of the above OE by the team determined that additional information from Harris would be helpful in determining actions to address the Prairie Island issue. Harris was contacted and a copy of their root cause evaluation (D45) was obtained. The RCE team's review of their identified causes and corrective actions was used as input in formulating actions to address the issue at Prairie Island.

VI. Nuclear Safety Significance

For the purpose of keeping this summary to a desirable length, instances and examples of attribute deficiencies may be found in Focus Self Assessment Report, PI-FSA-09-01, CAP AR# 01166830 and the charter statement of this root cause evaluation report (D2, D4)

There is a potential for nuclear and radiological safety challenges due to the ineffective and untimely corrective actions. Some examples are:

- The reliability of D5/D6 Emergency Diesel Generators that supply power to safety related equipment upon a loss of offsite power. Although complete now, the resolution of this issue was not timely.
- TSC habitability in the event of an emergency at the station due to ventilation issues. Although complete now, the resolution of this issue was not timely.
- Radiation monitoring repetitive failures could affect EAL classification and subsequent actions to protect the health and safety of plant personnel and the public.

Cross-cutting investigations, self assessments and previous root causes have identified issues; however, the timeliness to resolve these issues has been less than adequate. Additionally, with over 1800 open action items there is a possibility that one or more of those open action items may pose a nuclear, radiological or personnel safety concern.

- SCWE (D21, D29, D30, D32)

  Safety Conscious Work Environment is defined as an environment in which employees feel free to raise safety concerns, both to their management and to the NRC, without fear of retaliation and where such concerns are promptly reviewed, given the proper priority based on their potential safety significance, and appropriately resolved with timely feedback to employees.

With the above-mentioned potential safety significant items, the larger scope of the Principles for a Strong Nuclear Safety Culture needs to be discussed further. A Safety Culture is characterized by an organization's values and behaviors—modeled by its leaders and internalized by its members—that serve to make nuclear safety the overriding priority.

As a result of the interviews performed the team concluded that the individual contributors felt comfortable bringing up concerns with their supervisors and management. This meets the first part of the definition of SCWE.

Some of the attributes pertinent to this Root Cause Evaluation are:

- *Managers and supervisors practice visible leadership in the field by placing "eyes on the problem," coaching, mentoring, and reinforcing standards. Deviations from station expectations are corrected promptly.*

  Interviews with individual contributors revealed a perception that managers and supervisors are not available to address questions, standards and priorities. With approximately 700 hours of management observations per month the validity of this perception comes into question. Reinforcing the perception that supervisors are not available is a cross-cutting issue with Human Performance inadequacies. The team determined that part of the issue is the definition of "field observation." Observing work in the field is usually considered watching an operator perform a surveillance test or a maintenance technician repair a pump. Engineering work is usually done in an office environment but consists of work behaviors. As such the site management team needs to realize that observations "in the field" may constitute observing their direct reports in their cube or in the library. The result of manager/supervisor unavailability is that completion of "A" and "B" level corrective actions is hurried because of due date induced time pressure. (D27).

- *The organization maintains a knowledgeable workforce to support a broad spectrum of operational and technical decisions. Outside expertise is employed when necessary.*

  There is evidence that the work force has changed and a loss of knowledge and skills has resulted. This is evident in the performance of apparent cause and root cause evaluations. A lack of knowledge of the problem sometimes causes the evaluation to be incomplete or incorrect. A lack of knowledge of evaluation techniques has allowed less than adequate root cause evaluations resulting in as many as three different teams being chartered to address the same problem (D44 RCE01157726 - Rad Shipment).

- *Leaders recognize that production goals, if not properly communicated, can send mixed signals on the importance of nuclear safety. They are sensitive to detect and avoid these misunderstandings.*

There was a consistent message from interviews that while quality was a concern of the individual in all their work activities, meeting the due date of a CAP corrective action became priority. The evaluation would be performed in a format to meet grading requirements; however, the result is a lack of in-depth evaluation of "A" and "B" level corrective actions. This is symptomatic of manager/supervisor unavailability to ensure that questions are answered and standards and priorities are understood and maintained. (D27)

- *The bases, expected outcomes, potential problems, planned contingencies, and abort criteria for important operational decisions are communicated promptly to workers.*

  This attribute was not evident in interviews (D27) or document reviews (refer to reference list.)

- *Senior management incentive programs reflect a bias toward long-term plant performance and safety.*

  On the contrary the incentives were based on work completion within the CAP by the due date. At times this prejudiced the completeness of problem evaluation and adequate corrective action development (D27).

- *Decision-making practices reflect the ability to distinguish between "allowable" choices and prudent choices.*

  There is indication that conservative decision making for equipment issues allow addressing the symptoms such that they go away for the time although the cause is not addressed by corrective actions that restore the system to its original design or restore the margin of safety (refer to reference list).

- *Plant personnel apply a rigorous approach to problem-solving. Conservative actions are taken when understanding is incomplete.*

  There is strong supporting evidence that after the designation of a severity level and appropriate evaluation assignment, resources and management sponsors are not rigorously involved and approved procedures and processes not adhered to (D27).

- *Single-point accountability is maintained for important safety decisions, allowing for ongoing assessment and feedback as circumstances unfold.*

  There is sufficient evidence that this attribute is not occurring. The failure to implement timely corrective actions or to address top ten items supports this (D27).

- *Equipment is meticulously maintained well within design requirements.*

  In accordance with the charter problem statement this is not evident.

- *Anomalies are recognized, thoroughly investigated, promptly mitigated, and periodically analyzed in the aggregate.*

Anomalies are recognized and documented in the CAP process but the actions are not promptly taken to mitigate the problem. There has been no discussion on the aggregate impact of longstanding degraded equipment or processes that are not effective.

- *Workers identify conditions or behaviors that have the potential to degrade operating or design margins. Such circumstances are promptly identified and resolved.*

  Symptoms are addressed and corrected without restoring the design margin of safety. The concept of "reduced margin of safety" did not frequently come up in interviews (D27). Promptness is not evident as supported by the problem statement.

- *Individuals are well informed of the underlying lessons learned from significant industry and station events, and they are committed to not repeating these mistakes.*

  Industry Operating Experience is not used proactively. Interviews determined that adequate incorporation of distributed OE was lacking due to work load in other areas (D27). Expectations for using OE are not being reinforced by first-line supervisors IAW FP-PA-OE-01, Attachment 7, Expectations for Using OE (D47).

- *Expertise in root cause analysis is applied effectively to identify and correct the fundamental causes of events.*

  The training and qualification for root cause evaluators has not been an ongoing process. Some of the qualified personnel have not participated in Root Cause teams in several years and have had no refresher training. Lack of highly qualified RCE personnel has resulted in PARB frequently requesting changes to drafted RCEs.

- *Employees have confidence that issues with nuclear safety implications are prioritized, tracked, and resolved in a timely manner.*

  All personnel interviewed agreed with the problem statement of this RCE. Most suggested solutions that pointed to a lack of faith in the organization to provide the resources and tools to correct the problem. This perception was determined to be based on high work load, conflicting priorities and the lack of timely resolution of issues. (D27).

VII. Reports to External Agencies & the NSPM Sites

No reports will be made to external agencies. The CAP identifying this issue was posted on the February 17, 2009 NSP Nuclear Department Internal OE Report. When the RCE is complete and approved by PARB a follow-up posting will be made.

VIII. Data Analysis

The Root Cause Evaluation team was chartered and began work on March 19, 2009 (D4).

The multidisciplinary 6 person effort (including management sponsor, and an outside technical expert) comprised more than 167 years of work experience. The team spent more than 770 person hours: 1) reviewing documents (CAP FSA, CAPs, procedures, selective previous RCEs and ACEs); 2) making observations of AR Screening Team Meeting and AR pre-screening; and 3) conducting interviews.

The team employed failure modes analysis methods to evaluate human performance, process, and organizational issues. The site's corrective action trend code manual, containing tables for human performance, process, and organizational and management failure modes, was used to bin the interview and evaluation results. The tables were also used to clarify and focus information from the various interviews and evaluations. Additionally, the why staircase was applied to the inappropriate actions identified in the interviews, observations and failure modes analysis. The results were then evaluated based on the AR process flow diagram to determine the areas where inappropriate actions and evaluation results indicated problems exist. The AR process review led to a barrier analysis based upon the procedural instructions. Review, compilation of results, and evaluation provided insight to determine the root cause and significant contributing causes.

A. Information & Fact Sources

Twenty-nine employees were interviewed ranging from managers to administrative assistants [ref. Attachment 2]. A standard set of questions was used to gain an understanding of motivators and drivers associated with the corrective action process and job task performance [ref. Attachment 3]. Additionally AR 01165841, Focused Self Assessment (FSA), Determine the stations ability to effectively implement the corrective action program/process, RCE 01117841-01, WANO Peer Review AFI OR.2-2, RCE01141755-01, Identified NRC Crosscutting Issues, RCE01013473, RCE 01085806, RCE01099775, and RCE01100615, were reviewed and analyzed (D27 and D28).

B. Evaluation Methodology & Analysis Techniques

Because of the nature of this RCE a typical Event and Causal Factor chart could not be used. Instead an AR Process Flow Analysis was used (Attachment 9). The team started with a review of the AR Process FSA (D38), previous RCEs and other documents identified above. The team developed a set of interview questions in an effort to determine motivators and drivers that would indicate where process shortcomings existed. The team compiled the information from the various sources, populated the information into Failure Modes Analysis work sheets, and developed a set of inappropriate actions for analysis using the WHY

staircase. Corroborative conclusions by both methods of analysis would be indicative of the root cause. Final analysis was to pinpoint the problems and conclusions on an AR process flow analysis (Attachment 9) to determine focal points for barrier analysis. The AR process review led to a barrier analysis based upon the procedural instructions. Review, compilation of results and evaluation provided insight to determine the root cause and significant contributing causes.

C. **WHY Staircase Summary (Attachment 7)**

After review of AR 1165841, Focused Self Assessment on CAP program, and completion of the interview process, the team identified several inappropriate actions. The inappropriate actions identified were:

- IA-1, CAP AR initiators are not providing sufficient detail in the action request as required by FP-PA-ARP-01, Section 5.2.
- IA-2, Screening Team does not effectively /consistently apply the attributes of a strong nuclear safety culture.
- IA-3, Plant personnel are driven by due date without proper focus on problem solving and resolution.
- IA-4, Effective corrective actions are not consistently identified, or if identified, are not consistently completed.
- IA-5, Completed “A” Level actions and “B” level CAPs are not consistently reviewed and are not reviewed in a timely manner.

Following the why logic the team determined that the underlying causes are as follows:

1. The Plant focus on raw data and KPIs overrides quality of corrective actions. KPIs are a known measurable item and the plant staff strives to meet expectations. This raises the question, “Are we measuring the right stuff?”
2. Inadequate program management and inadequate interface with other processes drive competing priorities and allow plant staff to focus on due date vs. working what potentially is the “right stuff.”

Both underlying causes can have the unintentional effect of:

- “A” and “B” level CAPs action evaluation may be compromised due to the volume of work and due date on lower value items.
- Completed “A” and “B” level CAPs actions are not consistently reviewed and are not reviewed in a timely manner.

This is symptomatic of manager/supervisor unavailability to ensure that questions are answered and standards and priorities are understood and maintained.

D. **Failure Mode Summary**

The Failure Mode analysis examined three areas: Human Performance, Organizational and Management, and Process. The failure modes are from the Fleet CAP Trend Code Manual, FG-PA-CTC-01, associated with the CAP Program.

Note: Only the more significant applicable failure modes are discussed in this section. The attached tables provide information on other failure modes determined to be applicable, yet have fewer or less significant supporting facts.

Process Failure Mode (Attachment 4)

Process failure modes were evaluated based upon AR Process FSA (D-38), previous RCEs and personnel interviews. Team input from the various data sources identified four (4) key process failures:

- No process monitors [AR3]. Through interviews the team discovered that effective resolution of issues the first time was foremost on the mind of every interviewee. However, all interviewees indicated that the primary focus was on meeting the due date without consideration to priority. It was reported and verified through review of the procedure and Key Performance Indicators (KPIs) that due date is what is monitored and due date is where the workers focus. Line personnel reported the desire to go the extra distance to ensure effective resolution but high work load and competing plant priorities kept the focus on solving the symptoms and meeting due dates. Process monitors for quality do not exist or are not present in the minds of the PI staff. Resolution of "A" and "B" level ARs is addressed through grading. Grading for "A" and "B" evaluations is at the front end of the process. Grading at the front end does not adequately measure if the evaluation and resolution effectively resolved the issue. The FSA for the CA process also concluded that grading is not being effective at addressing quality resolution of long term problems.
- Only monitoring problems (late due dates) [AR4]. During the interview process the key indicator referenced by interviewees was late due dates. It was noted by several interviewees that the only item which generated a personal interview with the site VP is being late on an AR action. When asked about "A" and "B" level AR grading, interviewees indicated that they were managing their work to the degree of "what does it takes to get a passing grade?" The focus is on completing action items, not quality.
- Actions not tied to another process when necessary [RR5]. Discussion with interviewees indicated that competing site priorities factored heavily in what work they were doing. Emergent plant issues draw resources from across the organization regardless of the department's primary roles and responsibilities. The organization

pulls in the "expert" to address issues. This cultural tendency to use the "go to person" significantly impacts the level of effort used to address AR evaluations and corrective actions.

- Actions conflict with another process [RR4]. Discussion with interviewees included individual work load and work priorities. Many examples were discussed in which work management priorities did not align with the AR process priorities. Work management priorities have been improved to address the various aspects that impact equipment reliability and availability including:
  - Work Priority 1 through 5 based on FP-WM-WOI-01, Work Identification, Screening, Validation and Cancellation, work significance.
  - System Health Code 1 through 4 based on FG-E-02, Equipment Reliability Performance Indicators.
  - PM Critical Indicator based upon FP-E-SE-02, Component Classification.

  However the work management priority system does not interface with the CAP system. This leaves a void in every department's ability to effectively prioritize individual work tasks. Management defaults to "crisis management," and workers default to due date. Interviewees report that what gets worked depends on who is asking and the perceived urgency. This results in a highly motivated owner using personal networking to get some work done prior to potentially more important work.

Organizational and Management Failure Modes (Attachment 5)

Organizational and Management Failure Modes were evaluated based upon AR Process FSA (D-38), previous RCEs and personnel interviews. Team input from the various data sources identified the following key organizational and management failures:

- F-1, Inadequate Communication within Organization
  Poor problem statements written by the initiator and an inadequate review by the supervisor are the first steps in the process breakdown. Without manager/supervisor visibility with their "eye on the problem" within the department, production priorities and quality fall to the performer. The result is due date driven, with a target of meeting the minimum requirements.
- F-2, Inadequate Communication among Organizations
  Inadequate Communication among Organizations results in competing priorities, confusion, delays and rework. In any organization that has their resources stretched to the limits, confusion and rework is unacceptable.
- F-3, Inadequate Prioritization

Many examples were discussed in which work management priorities did not align with the AR process priorities. Work management priorities have been improved to address the various aspects that impact equipment reliability and availability including, Work Priority 1 through 5, System health Code 1 through 4, and PM Critical indicator. However the work management priority system does NOT interface with the CAP system. This leaves a void in every department's ability to effectively prioritize individual work tasks and results in competing priorities between departments.

- S-3, Insufficient Staffing.
  Every interviewee from manager to front line employee reported that the work load is greater than available resources. High work load combined with a less than adequate priority matrices results in high frustration and creates the potential for ineffective and untimely resolution of issues.
- F-6 Inadequate Program Management.
  Analysis indicates that F1, F2, F3 and S3 are all indicative of F6, Inadequate Program Management. Each of these failure modes is driving the other in an ever increasing competition for resources and resolution.

Human Performance Failure Mode (Attachment 6)

Interview data was used to populate the Human Performance Failure Mode table. However, upon evaluation of the data in conjunction with the RCE charter it was determined that all the applicable HU failure modes supported the Organizational and Management and Process Failure Mode analysis. No further analysis was performed.

Failure Modes Evaluation Conclusion (Attachment 8)

The organizational and management failure modes and the process failure modes were charted to evaluate drivers and impact. The chart shows that the underlying cause is inadequate program management which is impacted by five (5) key drivers (see Attachment 8):

1. F-2, Inadequate Communication among Organizations
2. F-3, Inadequate Prioritization
3. S-3, Inadequate Staffing
4. RR-4, Actions Conflict with Another Process (Priorities)
5. RR-5, Actions not Tied to Another Process when Necessary (Priorities)

The net result is that the lack of CAP process interface with other plant processes which are all in competition for limited resources results in inadequate prioritization of individual work load and ineffective process management.

E. **AR Process Flow Analysis (Attachment 9)**

The data and conclusions from the WHY and the Failure Modes Analysis were evaluated and applied to the AR Process Flow Chart (see Attachment 9). This analysis identified three key failure points contributing to inadequate program management: initial problem identification, screening, and completion reviews. The evaluation then applied the elements of a strong safety culture in an effort to determine where the site is falling short of the mark. Results are as follows:

- Initial problem identification -
  Attachment 13 of FP-PA-ARP-01 states that the problem statement in a CAP should be a clear statement of facts that includes the standard of performance, the observed or discovered performance, and how the performance deviates from the standard. Personal opinions not supported by fact should be avoided. Interviews indicated that this is almost never what the screening team sees. The Team concluded that inadequate problem statements and supporting information starts the CAP process off poorly because evaluations are focused on the problem statements and inadequate problem statements result in symptom solving, not problem solving. Poor problem statements written by the initiator and reviewed by the supervisor are the first step in the process breakdown. If the initial CAP write-up is less than adequate, the supervisor should return it to the initiator for clarification.

- Screening –
  Poor problem statements and inadequate research or misunderstanding the problem results in screening results that are less than effective. Failure to understand the problem has resulted in wrong actions assigned, inadequate evaluations and repeat issues. Although the number of holdovers may be increasing, the screening team seems reluctant to send things back for clarification. Instead of taking a best guess and compromising quality a poor problem statement should be returned to the supervisor. The number of holdovers and returns should be factored into CAP quality.

- Completion Reviews and Grading -
  The focus during closure review and grading of “A” and “B” level CAPs does not appear to ask: “Is the problem fully resolved?” Problems statements that are not always fully understood and organizational focus on meeting due dates result in problems that are not fully resolved. Completion reviews do not tie everything together and look beyond symptom solution. Effectiveness reviews can be removed from the problem by months or even years, only to find at the closeout review that we missed the boat completely. Failure to understand the problem results in inadequate evaluations, ineffective corrective actions and repeat issues. Completion reviews that

validate the symptom are resolved keep us in a circular pattern that results in repeat issues.

By shifting our focus to the attributes of a strong safety culture as they apply to job task execution during AR process implementation the plant will see an improvement in problem resolution and equipment availability and reliability.

F. **CAP Process Procedure Barrier Analysis (Attachment 11)**

NOS identified an adverse trend in CAP resolution of significant issues with examples in the four key CAP process elements, Issue Identification, Issue Screening, Issue Evaluation, and Issue Resolution/Timeliness of Resolution. The CAP procedure, FP-PA-ARP-01, and failure to adhere to the procedure, could be contributing to these significant issues. Evaluation of the procedure and areas for improvement are itemized in Attachment 11.

- Issue Identification –

  Expectations for the level of detail to be included in the problem statement are clearly stated. The procedure defines five separate functions responsible for insuring the problem statement meets the stated expectations. Failure to follow the procedure in this area is causing inadequate problem statements.

- Issue Screening –

  Several steps in the procedure provide direction for the screening team to reduce the number of actionable CAPs and focus site efforts on the most significant issues. The screening process is not screening out CAPs that do not need to be written, CAPs with similar issues where one can be closed and cross-referenced to the second, and CAPs that can be changed to a non-CAP. Failure of the screening process to require the Initiator and Initiator's Supervisor/Manager to provide a high-quality problem statement inhibits recognition of the significance of problems and level of effort required. Time requirements are emphasized. Multi-disciplinary teams should, but don't appear to be, considered for evaluations other than RCEs. Notes are not consistently being added addressing SCAQ, CAPR, and EFR requirements for all "A" CAPs. The composition of the screening team is not concretely defined to ensure the necessary knowledge and experience is available at screening team meetings.

- Issue Evaluation and Issue Resolution/Timeliness of Resolution –

  The procedure focuses on due date over quality. The only KPI referenced is for timely resolution of conditions adverse to quality, found twice in the procedure. FP-PA-ARP-01, Revision 21, Attachment 13, page 80 of 85, is the first and only mention of the existence of standards of quality required to be met by evaluations and corrective actions in the CAP procedure. There is no reference

or definition of those established standards. The Technical Review Panel results are not being used as a "quality of CAP action" KPI. The default due date is prescribed by the procedure. Consideration of the time required to accomplish an effective evaluation and corrective actions is not emphasized, measured, nor reinforced.

IX. Root Cause and Contributing Causes

On the surface the problem statement would indicate that the cause of this condition is simply weak or inadequate evaluation of identified problems. However, during the interview process all of the individual contributors interviewed clearly understood analysis, extent of cause and extent of condition. All the personnel interviewed indicated a desire to drive problems to completion. With this realization the Team needed to determine what the drivers are that prevent the site from consistently resolving significant issues. The RCE problem statement would also indicate that the CAP process is broken and all we need to do is fix the procedure. The evaluation determined there are instances of less than adequate procedure use and adherence; therefore a determination could not be made that the process is inadequate. The Procedure Review Barrier Analysis identifies areas for improvement within the procedure.

Working through the identified RCE evaluation methods including evaluating the CAP process the team concluded that the CAP process is not effectively managed. The team looked for the drivers that would be indicative of the root cause, and concluded there are four significant contributing factors driving ineffective resolution of significant issues:

- Work load is greater than available resources.
- Prioritization of individual work load is less than adequate (due date driven). This included the fact that there are no common site priorities to help manage work load.
- Failure to follow procedure (FP-PA-ARP-01).
- Due date is what is visibly measured and monitored, not quality.

The interesting thing about these contributors is that they drive each other. Work load is high due to numerous functional areas in each department, all demanding resource time. With no effective way to integrate priorities between the work management system, engineering work management system and the CAP process, due date becomes the controlling factor. Failure of supervision to effectively prioritize individual work load results in each individual controlling their work based upon due date. This prioritization is also seen in not removing items from the work load which provide limited value to the site. All work essentially becomes equal with due dates being the only differentiator. Coupled with this, the most visible indicator of CAP progress is the due date. Although some quality indicators are in place, they have limited visibility to the process implementers. For more significant items on which work is started late, challenges to quality have occurred when

there is a last minute rush to complete the work. This creates a potential to miss procedural closure requirements. The four contributors have a spiraling effect that can be seen in backlogs increasing and repeat issues in the CAP process.

Root Cause:

The team concluded that failure to achieve effective and timely problem resolution is due to inadequate program management and a weak nuclear safety culture. This is primarily the result of:

- **Root Cause – Management has failed to consistently enforce quality standards and set work priorities based upon procedural requirements and risk / benefit to the plant.**
- **Contributing Cause #1 – An integrated site priority matrix that interfaces with all plant process and programs does not exist.**
- **Contributing Cause #2 – There are no highly visible CAP process measures for quality.**
- **Contributing Cause #3 – Failure to perform all requirements within the procedure.**

The team concluded that the lack of integrated priorities results in "C" level items done at the expense of "A" and "B" level items which is indicative of a weak safety culture. The team determined that the principals are understood, however they are not demonstrated. The principles for a Strong Nuclear Safety Culture would indicate that an organization's values and behaviors, modeled by its leaders and internalized by its members, serve to make nuclear safety the overriding priority. The purpose of the corrective action process is to ensure that conditions adverse to quality are identified and effectively resolved in a timely manner.

Based on the evaluation of the safety culture attributes as discussed in Section VI, and the results of the various evaluations performed by the RCE, the team concluded that there is a breakdown in three of the attributes:

1) (attribute 1) Everyone is personally responsible for nuclear safety.
2) (attribute 2) Leaders demonstrate commitment to safety.
    - *Managers and supervisors practice visible leadership in the field by placing "eyes on the problem," coaching, mentoring, and reinforcing standards. Deviations from station expectations are corrected promptly and,*
    - *Leaders recognize that production goals, if not properly communicated, can send mixed signals on the importance of nuclear safety. They are sensitive to detect and avoid these misunderstandings.*

3) (attribute 4) Decision-making reflects safety first.

- *Leaders recognize that production goals, if not properly communicated, can send mixed signals on the importance of nuclear safety. They are sensitive to detect and avoid these misunderstandings.*
- *Decision-making practices reflect the ability to distinguish between "allowable" choices and prudent choices.*

Examples:

- Manager presence in the associated work area is less than needed resulting in employees setting their own priorities.
- CAP and work management priorities compete for limited resources.
- The engineering work management system does not interface with the plant work management system for establishing priorities and controlling work load.
- CAP interface with the engineering work management system consists of CAP due dates.
- RCE grading routinely fails to meet quorum requirements.
- RCE team member assignments are not respected.

These attributes are reflected in an organization that is focused and has a set of clear standards and expectations, where management presence and interface with their staff is routine and ongoing, and success is measured by effective results and resolution of actions. As discussed above and identified in the evaluations and interviews, management availability is limited, priorities are unclear, changing and competing, work is due date driven and focused on the KPIs that measure due date not quality. Addressing the root and contributing causes will strengthen our safety culture in this area.

X. Corrective Actions

Corrective Actions to Restore (broke-fix)

- No corrective actions required. This was not an equipment issue.

Interim Corrective Actions (mitigation)

- CA #1 (01166830-04) – Develop and implement a Site CAP resolution quality and timeliness Key Performance Indicator. The indicator should be a weighted formula based upon quality, due date and how long a CAP has been open. TRP results would be a key input to this indicator.
  Responsible Group: Fleet CAP Manager,
  Completion Due Date: August 21, 2009

- CA #2 (01166830-05) – Establish management expectations and accountability for the following:
  - PARB to define required departments for each root cause grading to ensure effective cross-organizational review.
  - Change TRP review of completed actions to include.
    - Review of Level "A" actions, not just the final CAP
    - A random sample of completed "B" evaluations/actions, using total population of completed "B" actions, Sample Size Determination Table (FP-G-CD-01 Attachment 1) and random number generator.
    - Identify quality resolution / recognition
  - The "A" and "B" "Owed To" is accountable for quality and timeliness.
  - Institute a 14 day owed to review of all level "A" actions as they are closed
  - Communicate all RCE issues and results to the site.

  This is an ongoing activity that should be monitored through the paired observation program.

  Responsible Group: Business Support Manager,
  Completion Due Date: June 15, 2009
- CA #3 (01166830-06) – Revise FP-PA-ARP-01 to address the following issues:
  - Clearly state what function is responsible for writing the evaluation assignment statement – Section 5.5, 5.6, 5.7.
  - Designate between SCAQs, CAQs and non-CAQs as part of the screening process and documented priority.
  - Attachment 9 is only referenced in step Section 5.10, but includes information relevant to multiple other steps. Provide reference to Attachment 9 in all applicable sections.
  - Identify Responsible Individual(s) in left column – Section 5.10.
  - Screening charter states "determine the level of effort". Clarify statement to state meaning of that phrase – determine if RCE, ACE, CE, or CA is needed.
  - Composition of screening team allows minimum quorum (shall) that may not include representatives from appropriate departments (should) – Attachment 8. Re-evaluate quorum requirements such that all appropriate departments are represented.

- Change Attachment 10, TRP Charter to require review of all closed "A" actions (not waiting for completion of CAP), and a random sample of completed "B" evaluations/actions (not waiting for completion of CAP), using total population of completed "B" actions, Sample Size Determination Table (FP-G-CD-01 Attachment 1), and random number generator. Add random number generator, Sample Size Determination Table to procedure.
- Change Attachment 10, TRP Charter to proceduralize chart, currently viewed only by TRP team, to be presented formally to PARB. Revise chart to use "actions" as units on y-axis.

Responsible Group: Fleet CAP Manager,
Completion Due Date: June 30, 2009

- CA #4: (01166830-07) – Complete a site rollout of the Principles for a Strong Nuclear Safety Culture. This should include continuing exposure at Management meetings, Leadership Forums, D15 Team Notes write-ups, and observations, mentoring and coaching at all levels of management and supervision. (Closeout will be based on initial rollout. Use FSA to validate.)

  Responsible Group: Pride Initiative Manager
  Completion Due Date: July 30, 2009

- CA #5 (01166830-08) – Once CAP priority matrix has been created, complete a department led review of current AR backlog to apply the new standards, and prioritizing / managing employee work load.

  Responsible Group: Business Support Manager,
  Completion Due Date: June 20, 2009

Corrective Actions to Prevent Recurrence (CAPRs)

- CAPR #1 (01166830-09) – Develop and implement a CAP priority matrix designed to interface with the work management process and the engineering work management system.
  Responsible Group: Business Support Manager,
  Completion Due Date: May 20, 2009

- CAPR #2 (01166830-10) – Develop and implement a Department CAP Health Indicator. The indicator should be a weighted formula based upon quality, due date and how long a CAP has been open.
  Responsible Group: Fleet CAP Manager,
  Completion Due Date: June 15, 2009

- CAPR #3 (01166830-15) – Provide Root Cause Evaluation refresher training to all qualified RCE personnel.
  Responsible Group: Business Support Manager,
  Completion Due Date: June 15, 2009

Other Corrective Actions

- CA #6 (01166830-11) – Change default sort settings for AT-0085 Supervisors Report to severity level, then due date. Initiate an ITAR and track to closure with this CA.

  Responsible Group: Performance Assessment Supervisor,
  Completion Due Date: June 15, 2009

- CA #7 (01166830-12) – Change the Corrective Action Effectiveness Indicator (MRM) "meets" standard to 100%

  Responsible Group: Fleet KPI Manager,
  Completion Due Date: June 15, 2009

Effectiveness Reviews:

- EFR #1 (01166830-13) – Complete a FSA on CAP process effectiveness based on EFR results of severity level "A" and "B" CAPs closed in the last half of 2009, newly developed site and department quality indicators, and NOS audit reports. Success will be indicated by: all CAPs are prioritized with the new codes, the new quality indicators are being utilized by departments to drive performance (suggest interviews of employees), and the new indicators are blue or green trending to blue for 1st quarter of 2010.

  Responsible Group: Business Support Manager,
  Completion Due Date: March 31, 2010

- EFR #2 (01166830-14) – Complete a FSA on CAP process effectiveness by evaluating EFR #1 results, site and department quality indicators, and NOS audit reports. Success is effective resolution of significant issues as indicated by: increased trend in equipment reliability, reduced operation transients and no repeat non-compliance with regulatory requirements. Measurement will be reflected in the MRM KPI's indicating Blue for the identified areas. Due date 4th quarter of 2010.

  Responsible Group: Business Support Manager,
  Completion Due Date: December 31, 2010

Corrective Action Matrix

Root Cause / Contributing Cause	CAPR / EFR / CA	IA / FM
RC	CAPR #1 CAPR #2 CAPR #3 CA #5 EFR #1 EFR #2	IA-2, IA-3, IA-4, & IA-5 F-2, F-3, F-6, RR-4, RR5, AR-3, AR-4, & S-3
CC #1	CAPR #1 CA #5	IA-3 & IA-4 F-2, F-3, F-6, RR-4, RR-5, & S-3
CC #2	CAPR #2 CA #1 CA #2 CA #4	IA-3, IA-4, & IA-5 F-2, F-3, F-6, AR-3, AR-4, RR-4, RR-5, & S-3
CC #3	CA #3	IA-1 & IA-5 F-2, F-3, F-6, AR-3, AR-4, & S-3

XI. References

Doc #	List	Date/Rev
1	FP-PA-ARP-01. CAP Action Request Process	01/30/2009 Rev 21
2	CAP01166830, SCAQ –Inadequate CAP Resolution of Significant Issues	01/26/09
3	FP-PA-RCE-01, ROOT CAUSE EVALUATION MANUAL	7/30/2008 Rev 14
4	RCE01166830 Charter	
5	RCE01013473, D6 High Crankcase Pressure Resulting in Unit 2 Shutdown	02/03/2006
6	RCE01085806, BKR 16-7, 12 SI PUMP Breaker Inoperable	04/03/2007
7	RCE01141755-01, Identified NRC Crosscutting Issues	07/02/2008
8	RCE01100615, CAPRs Closure Conflicts with Procedural Requirements	06/15/2007
9	RCE01117841, WANO Peer Review AFI OR.2-2	01/02/2008
10	FP-PA-ARP-01. CAP Action Request Process	Rev 19
11	FP-PA-ARP-01. CAP Action Request Process	Rev 17
12	FP-PA-ARP-01. CAP Action Request Process	Rev 15
13	AR01139790, PU.02.E.2.a, Work Initiation and Screening	06/03/2008
14	RCE01099775, High Radiation Area, Locked High Radiation Area, and Very High Radiation Area Controls	09/07/2007
15	RCE01165133, Human Performance & Cross-Cutting NRC Violations	03/25/2009
16	OE28449 - Procedure Technical Content Issues (Palo Verde Nuclear Generating Station)	05/11/2007
17	OE28283 - Corrective Action to Prevent Recurrence (CAPR) from a Root Cause was incorrectly documented as being complete (Pilgrim)	01/06/2009
18	OE22639 - NRC Identifies Crosscutting Issue In The Area Of Problem Identification And Resolution - Columbia	03/02/2006
19	OE16574 - Lack of Completeness of Information Provided in Problem Identification and Resolution Documents at Davis Besse	06/02/2003
20	Site Drum Report July –December 2008	02/22/2009
21	CERTREC - NRC Reactor Oversight Process - Safety Culture Vulnerabilities	2009
22	AT-0075 AR Screening Report - 3/30/2009	03/30/09
23	AT-0075 AR Screening Results - 3/30/2009	03/30/2009
24	ACE01163206, A CAP action due date extension was appropriately requested but not granted	
25	NRC Reactor Oversight Program Substantive Cross-Cutting Issues 2008 Annual Assessment Letters	03/04/2009
26	PINGP Screen Team Standard Agenda	03/30/2009

Doc #	List	Date/Rev
27	Interview Notes (all)	
28	Interview Questions	
29	Sorting Out Safety Culture (The Nuclear Professional)	
30	The Culture Question (The Nuclear Professional)	
31	INPO 05-003, Performance Objectives and Criteria	May 2005
32	Principles for a Strong Nuclear Safety Culture - INPO	11/2004
33	WANO 2007 AFI PD Strength AR Matrix	
34	PARB Agenda Reviews	01/01/2008 to 3/24/2009
35	PARB review of completed RCEs	2008
36	Department Clock Reset CAP01170951	4/3/2009
37	FP-E-ECR-01, Engineering Change Request	2-4-09 Rev 3
38	Focus Self Assessment Number: PI-FSA-09-01 AR Number: 01165841	Jan. 12-16, 2009
39	Sep08 – Feb09 TRP Summary Chart	
40	OE27290 - Harris identified that some important or longstanding problems related to organizational deficiencies are not driven to resolution through CAP implementation	5/19/2008
41	QF-0429, Rev 4, NSPM Screen Team Standard Agenda	Rev 4
42	PII Commonly Seen Cause & Effect Relationships for Use During Stream Analysis and Failure Mode Charts	
43	FG-PA-PAR-01, Rev. 9, Performance Assessment Review Board Guideline	2/20/2009 Rev 9
44	RCE01157726, Radioactive Material Shipment Exceeded DOT Limits	10/30/2008
45	CERTEC Common Cause Evaluation Report	2/17/2009
46	Harris RCE Report – Significant Adverse Condition Investigation Report	5/19/2008
47	FP-PA-OE-01, Operating Experience Program	10/31/2008 Rev 10

XII. **Attachments**

Attachment 1 – RCE Charter

Attachment 2 – Interview List

Attachment 3 – Interview Questions

Attachment 4 – Process Failure Modes

Attachment 5 – Organizational and Management Failure Modes

Attachment 6 - Human Performance Failure Modes

Attachment 7 – Why Staircases

Attachment 8 – Failure Modes Analysis Diagram

Attachment 9 – AR Process Flow Analysis

Attachment 10 – RCE Action Review Summary

Attachment 11 – Procedure Review Barrier Analysis

ROOT CAUSE EVALUATION MANUAL

FG-PA-RCE-01

Root Cause Evaluation Charter

CAP AR # 01166830

Manager Sponsor: Tim Allen

Problem Statement:

The Corrective Action Program at Prairie Island has not consistently resolved significant issues resulting in decreased equipment reliabity, operational transients and repeat non-compliance with station procedures and regulatory requirements

Investigation Scope:

The team will review data contained within the corrective action program and determine what aspect or aspects of the corrective action process are not functioning sufficiently to prevent rework and repeat conditions.

This investigation will include A and B severity level CAPs and CAP actions starting on January 1, 2008. Data prior to that period will not reflect the effects of substantive changes in process

Investigation Methodology:

Methodologies will include: event and causal factor charting, interviews, barrier analysis, change analysis, why staircase. The team will use the above methodologies to ensure the criteria identified n NRC IP95001 are satisfied.

Team Members:

Team Leader: Rick Myers
Team Member: WD associates <Lloyd Calvery>
Team Member: Fred Ericson
Team Member: Gene Woodhouse, Performance Assessment
Team Member: Robbie MilesBoysen
Consultant for CAPRs: Al Smith / Amanda Bierbauer

Milestones:
Date Assigned: 1/27/09
Start: – 3/19/09 (Kickoff Meeting)
Status Update: PARB 4/8/09
Draft Report: 4/10/09
Final Report: 4/20/09

Communications Plan:
The results of the RCE determination will be communicated to the site via a D-15 communication. Additional communiqué will be provided as the analysis uncovers opportunities.

Approved: ___Tim Allen_____ **Date:** ___2/27/09
Management Sponsor

Approved by: **Screen Team /** PARB on _____
Date

Interview List

1	Engineering Design Manager	1
2	Nuclear Plant Attendant	1
3	Inspection and Materials Supervisor	1
4	Engineer	11
5	Performance Assessment Supervisor	1
6	Plant Engineering Supervisor	1
7	Steam Generator Project Supervisor	1
8	Planning Supervisor	1
9	PI Security Analyst	1
10	Performance Assessment Coordinator	1
11	Elec/I&C Design Supervisor	1
12	Elec/I&C Supervisor	1
13	Work Control Center Manager	1
14	Work Week Manager	1
15	Plant Manager	1
16	Electrical Maintenance Technical Advisor	1
17	Ops Support Manager	1
18	CAP Coordinator	1
19	Operations Manager	1

Interview Questions

Charter: The corrective action program at Prairie island has not consistently resolved significant issues resulting in decreased equipment reliability, operational transients and repeat non-compliance with station procedures and regulatory requirements.

1. What are your thoughts about the charter?

2. Do you have any examples for equipment reliability, operational transients and repeat non-compliance with station procedures and regulatory requirements?

3. Who owns the CAP process?

4. What is the key driver when performing a RCE/ACE or CE?

5. What factors are at play when you perform an ACE/CE/CA or other CAP action assignment? What controls the time and quality of the product? Do you feel like that time pressure impacts product?

6. When you write a CAP and corrective actions are assigned, does the performer of the CA discuss the issue with you?

7. In your own words what is “extent of Cause”?

8. In your own words what is “extent of condition”?

9. How much and what type of training have you had for performing RCE/ACE?

10. How is OE integrated into plant activities before a problems occur?

11. If a CAP / AR is ranked a “D” or closed to trend, is there communication with initiators as to why?

12. Last Question – One thing you would do to fix this problem?

Attachment 4

Process Failure Modes

I = Individual Related RR = Roles & Responsibilities Related AR = Accountability Related

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Actions Not Specified **(RR1)**	The action(s) that an individual or group must perform to accomplish a task are not contained in the document or instruction.	Applicable	S- CAP liaison duties are not proceduralized, A JFG is required S – QF 0430 Ace grading sheet Cause and effect: F6 Inadequate Program Management
Actions Not Clear **(RR2)**	The action(s) that an individual or group must perform to accomplish a task are not clearly described in the document or instruction.	Applicable	S- Instructions or requested action on the AR are not clear – is not always resolved by the assignee. The assignee tries to determine what issue to resolve. (D-27) S- The AR screening team make-up and quorum are not specific and constantly changing. . (D-27) S- Department clock reset AR # 01170951- explaining proper CAPR closeouts (D-36) S- Inconsistent understanding of the CAP process (D-27) Cause and effect: F6 Inadequate Program Management
Actions not within Control of the Individual **(RR3)**	The action(s) that an individual or group must perform to accomplish a task cannot be performed as specified (physical constraints, do not have authority to dictate results, etc.).	Applicable	S- Actions are not able to be completed due to previous perquisite actions are not completed . (D-27) S- Interviewee stated do not always have time to properly analyze the problem (D-27) S- CAP extensions are difficult to obtained (D-27)
Actions Conflict with Another Process **(RR4)**	The action(s) that an individual or group must perform to accomplish a task conflict or contradict the actions specified by another document or instruction.	Applicable	S- ECR process has it own grading system for prioritization System health, work order priority (D-37,38) Cause and effect: F6 Inadequate Program Management
Actions Not Tied to Another Process When Necessary **(RR5)**	The action(s) contained within one document or instruction does not reference supporting documents or instructions when necessary.	Applicable	S- CAP action priorities not tied into the work management matrix priorities Cause and effect: F6 Inadequate Program Management

Attachment 4

Process Failure Modes

I = Individual Related *RR = Roles & Responsibilities Related* *AR = Accountability Related*

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Methods Not Clearly Defined **(RR6)**	Action(s) are required by the document or instruction, but the method to accomplish the actions is not clearly specified by the document or instruction.	Applicable	S- Interviewee stated the instruction manual for performing the HUIE, ACE did not match-up with the associated forms, since then the instructional manuals have been revised to better match the associated forms. manual instructions do not match-up with associated forms. (D-27) S- Procedures do not reference use of tri folds for PASSPORT (D-27)
Unnecessary Actions Required **(RR7)**	The document or instruction require the performance of certain actions that is not really necessary to successfully perform the action.	Not Applicable	No evidence
Wrong Information **(RR8)**	The information provided in the document or instruction is incorrect.	Applicable	S- Trend codes in CAP process are inconsistently entered. (D-27)
Critical Actions Not Verified **(AR1)**	Critical actions required to successfully perform a task are not verified within the process.	Applicable	R- Purchase 100 rubber stamps to stamp critical steps in work procedures. **Note:** for improvement, forward to the procedure group the critical steps that are stamped on a procedure for inclusion in next procedure revision. (D-27)

Attachment 4

Process Failure Modes

I = Individual Related *RR = Roles & Responsibilities Related* *AR = Accountability Related*

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Excessive Verifications **(AR2)**	The document or instruction requires excessive verification of completed steps or tasks. Actions are verified, regardless of criticality to the task or the task has multiple reviews and verifications instead of a single, specific review.	Not Applicable	No evidence
No Process Monitoring **(AR3)**	There is no established means of monitoring the success or failure of the process.	Applicable	S- difficult to find/use a meaningful monitoring system for trending (D-27) S- CAP actions not reviewed until CAP all actions are completed – may be picked up by TRP – no established policy (D-27) S- TRP conducts a sampling of A level actions and B and C level caps. This does not follow the guidelines in procedure FP-PA-ARP-01 Attachment 10 (D-27) S- DRUM processes have not evolved to a workable tool that provides its intended purposes. (D-27) R – grading system for RCR and ACE (D-27) Cause and effect: F6 Inadequate Program Management
Only Monitoring Problems **(AR4)**	The only method of monitoring process performance is to observe problems when they occur.	Applicable	S- Monitoring by due date quality is lowered (D-27) S- Monitor by KPI (D-27) S- KPI are lagging indicators (D-27) Cause and effect: F6 Inadequate Program Management
No Acceptance Criteria **(AR5)**	No acceptable performance parameters have been established for the process, procedure or task.	Applicable or Not Applicable	R- grading process for RCE and ACE (D-27) S- due dates used to monitor for KPI (D-27) S- acceptance criteria by TRP (D-27)

Process Failure Modes

I = Individual Related *RR = Roles & Responsibilities Related* *AR = Accountability Related*

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
No One Specified to Perform Task **(I1)**	No one is specified (either by title, group, or other means) as responsible for completion of the actions required by a document or instruction.	Applicable or Not Applicable	No evidence
More Than One Person Specified to Perform Task **(I2)**	More than one person or group is specified (either by title, group, or other means) as responsible for completion of the actions required by a document or instruction.	Not Applicable	No evidence
Person Specified Not Able to Perform Task **(I3)**	The person or group specified (either by title, group, or other means) as responsible for the completion of the required actions in a document or instruction is unable to perform the action. Typically because they do not have the skill or knowledge.	Applicable	S - ACE assigned to unqualified person S- Interviewees stated everyone owns the CAP process therefore no one owns it.

Attachment 5

Organizational and Management Failure Modes

S = Structural Issues *F = Functional Issues* *C = Cultural Issues*

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Inadequate Span of Control **(S1)**	Horizontal organizational design – the number of personnel which a supervisor is responsible for is too large or too few for the groups oversight & responsibilities. This often creates problems with task assignment and accountability.	Not Applicable	No evidence
Inadequate Levels in the Organization **(S2)**	Vertical organizational design – the number of levels or layers, from senior manager to employee is too many or too few for the given activity. Creates problems with communication of expectations.	Applicable	S – makeup of screening team not most knowledgeable, experienced, or decision-makers (D27) Cause and effect • C3 INADEQUATE KNOWLEDGE
Insufficient Staffing **(S3)**	Comprehensive organizational design – the total number of employees for which the company or group is designed are not filled. Often causes staff work overload and poor accountability.	Applicable	S – can't fill open slots (D27) Are we allocating resources appropriately? (D27) Spots filled, but not enough for workload (D27) Cause and effect • C3 INADEQUATE KNOWLEDGE • F3 INADEQUATE PRIORITIZATION • F5 INADEQUATE EMERGING ISSUES MANAGEMENT
Inadequate Communication within an Organization **(F1)**	A breakdown in communication (written or verbal) within one organization or work group. Often leads to important issues not being addressed and critical process breakdown.	Applicable	S – RCE team members (and site) don't hear outcome (D27) TRP results not communicated to site (D27) Site not aware when RCEs going on – the start (D27) Work group – managers/supervisors not available (D27) Cause and effect • C1 INADEQUATE TRUST • C2 INADEQUATE TEAMWORK • F4 INADEQUATE PLANNING • F6 INADEQUATE PROGRAM MANAGEMENT

Organizational and Management Failure Modes

S = Structural Issues *F = Functional Issues* *C = Cultural Issues*

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Inadequate Communication among Organizations **(F2)**	A breakdown in communication (written or verbal) among two or more organizations or work groups. Often leads to a breakdown in processes that require several groups to participate.	Applicable	S – actions not clear in CAP (D27) Closed to trend – no communication (D27) <u>Cause and effect</u> • C1 INADEQUATE TRUST • C2 INADEQUATE TEAMWORK • F4 INADEQUATE PLANNING • F6 INADEQUATE PROGRAM MANAGEMENT
Inadequate Prioritization **(F3)**	Deficiencies in determining which work takes precedence over other work. Often leads to unexpected equipment failures or failure to meet regulatory requirements.	Applicable	S – Top 10 issues (D27) 3 different RCE teams for rad shipment – NRC attention raised significance (D27) R - PR 1-5 – set up to maintain and improve (D27) <u>Cause and effect</u> • C1 INADEQUATE TRUST • C2 INADEQUATE TEAMWORK • C3 INADEQUATE KNOWLEDGE • F4 INADEQUATE PLANNING • F5 INADEQUATE EMERGING ISSUES MANAGEMENT • F6 INADEQUATE PROGRAM MANAGEMENT • S2 INADEQUATE LEVELS IN THE ORGANIZATION • RR4 ACTIONS CONFLICT WITH ANOTHER PROCESS • RR5 ACTIONS NOT TIED TO ANOTHER PROCESS WHEN NECESSARY

Organizational and Management Failure Modes

S = Structural Issues *F = Functional Issues* *C = Cultural Issues*

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Inadequate Planning **(F4)**	Deficiencies in determining what work must be done, by whom, when, and how long it will take. Often leads to staff work overload, budget over-runs and low morale.	Applicable	S – due date driven (D27) Inadequate consideration of length of time needed (D27) Shortage of qualified staff (reviews) (D27) Cause and effect • F1 INADEQUATE COMMUNICATION WITHIN AN ORGANIZATION • F2 INADEQUATE COMMUNICATION AMONG ORGANIZATIONS • F3 INADEQUATE PRIORITIZATION • RR4 ACTIONS CONFLICT WITH ANOTHER PROCESS
Inadequate Emerging Issues Management **(F5)**	Deficiencies in determining how to deal effectively with unexpected issues. Often leads to continual "crisis management" and low morale.	Applicable	S – fighting fires; reactive, not proactive (D27) Focus on symptoms instead of root cause, crisis reoccurs (D27) Shift from engineering to operations focus (D27) Cause and effect • F3 INADEQUATE PRIORITIZATION • S2 INADEQUATE LEVELS IN THE ORGANIZATION • RR4 ACTIONS CONFLICT WITH ANOTHER PROCESS • RR5 ACTIONS NOT TIED TO ANOTHER PROCESS WHEN NECESSARY

Organizational and Management Failure Modes

S = Structural Issues *F = Functional Issues* *C = Cultural Issues*

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Inadequate Program Management **(F6)**	Inadequate oversight of critical work processes to ensure they function smoothly and effectively. Often results in program degradation over time or increased problems within those processes.	Applicable	S – Management sponsors not consistently engaged with RCE team (D27) Owed to not effectively managing CAPRs from RCEs (D27) KPIs not measuring wrong thing – not measuring quality of actions (D27) PARB not consistently performing timely reviews of EFRs (D34) Difficulty in due date extensions result in quality degradation (D27) Ineffective alignment among CAP, Work Management, Site priorities (D?) Passport rollout not managed effectively so lost internal OE (D27) DRUM report doesn't provide meaningful information (D27) CAPR due dates from different RCEs overlapping (D?) New RCEs launched before EFRs complete on CAPRs for same issues (D?) Multiple groups identifying same issues, no consolidation, multiple RCEs from multiple directions addressing the same issues (D?) Shift from engineering to operations focus (D27) Inattention to detail on the part of many management team members (RCE approval and CE performance) (D36) PARB members don't all consistently review and comment on RCE (D35, D27) Individual contributor challenged manager regarding procedure use and adherence and was advised to proceed in a manner not adherent to procedure (D27) <u>Cause and effect</u> • C1 INADEQUATE TRUST • F1 INADEQUATE COMMUNICATION WITHIN AN ORGANIZATION • F2 INADEQUATE COMMUNICATION AMONG ORGANIZATIONS • F3 INADEQUATE PRIORITIZATION • AR1 CRITICAL ACTIONS NOT VERIFIABLE • AR3 NO PROCESS MONITORING • AR4 ONLY MONITORING PROBLEMS • RR1 ACTIONS NOT SPECIFIED • RR2 ACTIONS NOT CLEAR • RR4 ACTIONS CONFLICT WITH ANOTHER PROCESS • RR5 ACTIONS NOT TIED TO ANOTHER PROCESS WHEN NECESSARY

Organizational and Management Failure Modes

S = Structural Issues *F = Functional Issues* *C = Cultural Issues*

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Inadequate Trust **(C1)**	A lack of confidence in the workgroup or members of the workgroup, or a disbelief in information shared. Often results in fractured work completion and stress levels.	Applicable	S – Top 10 Equipment List, important or not? (D27) Minor Mods not initiated due to belief Design Engineering won't get to it (D27) RCE – lack of management support (D27) RCE – belief management won't accept results of RCE efforts (D27) PARB – change root cause, contributing cause, corrective actions of RCE team shows lack of trust in root cause team results R – PARB member does trust the root cause process and outcome (D27) <u>Cause and effect</u> • F1 INADEQUATE COMMUNICATION WITHIN AN ORGANIZATION • F2 INADEQUATE COMMUNICATION AMONG ORGANIZATIONS • F3 INADEQUATE PRIORITIZATION • F6 INADEQUATE PROGRAM MANAGEMENT
Inadequate Teamwork **(C2)**	Constant friction among the workforce, or an unwillingness to work with one another. This problem could exist within organizations or between organizations. Results in confusion within the ranks and a lack of information flow among the groups.	Applicable	S – competing priorities (D27) Unclear roles and responsibilities (D27) <u>Cause and effect</u> • C3 INADEQUATE KNOWLEDGE • F1 INADEQUATE COMMUNICATION WITHIN AN ORGANIZATION • F2 INADEQUATE COMMUNICATION AMONG ORGANIZATIONS • F3 INADEQUATE PRIORITIZATION

Attachment 5

Organizational and Management Failure Modes

S = Structural Issues *F = Functional Issues* *C = Cultural Issues*

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Inadequate Knowledge **(C3)**	An inadequate understanding of the work to be performed and how the work ties into the overall goals. Often causes individual errors to occur.	Applicable	S – Poor action descriptions (D27) Lack of initiator/owed to discussion with assignee (D27) CAP process doesn't tie into site priorities (D?) ACE – not given problem statement (D27) Shift from engineering to Ops-led (D27) New people not familiar with process/priorities AR Screening team not necessarily the most knowledgeable, experienced, decision-maker SI 9-5 mechanical agitation, D5/D6, R11/R12, EH mod, Instrument Air (D27) <u>Cause and effect</u> • C2 INADEQUATE TEAMWORK • F3 INADEQUATE PRIORITIZATION • S2 INADEQUATE LEVELS IN THE ORGANIZATION • S3 INSUFFICIENT STAFFING
Lack of Commitment **(C4)**	A lack of dedication to the work. Often results in inconsistent or unreliable performance by an individual or group.	Applicable	S – one example of individual knowingly closing incomplete action, challenged, admitted, and not corrected by individual (D27) R – Evidence that with the exception noted above, all wish to do quality, timely, meaningful work (D27)
Inadequate Self Assessment **(C5)**	A failure to continually encourage feedback, listen to customer input, or look at better ways to perform. Often creates a false sense of security and leads to complacency.	Applicable	S – inconsistent follow-through to resolution (D27) R – ample evidence of self-assessment (D38)

Attachment 6

Human Performance Failure Modes

A = Attentional Issues **J = Judgment Issues** **K = Knowledge Issues**

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Inattention **(A1)** Type - **SB**	Not paying attention to the task requirements. Not paying attention to information in the immediate environment.	Not Applicable	No evidence
Bored **(A2)** Type - **SB**	Inadequate level of mental activity due to performance of repetitive actions or lack of activity.	Not Applicable	No evidence
Habit / Reflex **(A3)** Type - **SB**	Ingrained or automated pattern of actions attributed to the repetitive nature of a well-practiced task or a natural response.	Not Applicable	No evidence
Tired & Fatigued **(A4)** Type – **SB/RB/KB**	Degradation of physical or mental abilities due to illness, a lack of rest, or influences associated with body rhythms.	Not Applicable	No evidence
Distracted & Interrupted **(A5)** Type - **SB**	Conditions of task or the work environment require the individual to stop and restart a task, diverting the individual's attention from the task at hand.	Applicable	S – Emergent issues require work on CAP actions to be stopped and restarted and result in repeated extension request. S – RCE team make-up (PI Rad Shipment RCE required 3 different teams to complete and RCE on D5 Tagging Issues team did not stay together until report was complete.
Multi Tasking **(A6)** Type - **SB**	Performing two or more tasks simultaneously and neglecting to perform a required element of one or more of the tasks.	Not Applicable	No evidence
Lapse of Memory **(A7)** Type - **SB**	Momentary loss of memory regarding information previously learned and known.	Not Applicable	No evidence

Human Performance Failure Modes

A = Attentional Issues J = Judgment Issues K = Knowledge Issues

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Inadequate Tracking (Place Keeping) **(A8)** Type – **SB/RB**	Method used to maintain control of information, necessary requirements, or status was not properly used.	Not Applicable	No evidence
Time & Schedule Pressure **(A9)** Type – **SB/RB/KB**	Urgency or excessive pace required to perform the task. No spare time allotted or perception by the individual that a tight schedule exists.	Applicable	S – Due date driven for assignments (D27) S – Due date extensions difficult to get (D27)
Fear of Failure **(A10)** Type – **SB/RB/KB**	Apprehension regarding potential adverse consequences if the individual fails to perform at a high level, resulting in undesirable behaviors.	Applicable	S – expectation is to meet due date and impression we are driven to meet KPI's
Imprecise Communication **(A11)** Type – **SB/RB**	Miscommunication resulting from error of omission or commission by the sender or receiver. This includes breakdowns of the three-part communication process.	Applicable	S – lack of clear problem statement on ACE CAP S – feedback to CAP initiator on CAP's closed to CTT, CTAT is LTA R – feed back on RCE and ACE grading S – feedback to site on significant issue (new RCE) and results of RCE
Cognitive Overload **(J1)** Type – **RB/SB**	Mental demands on the individual to maintain a high level of concentration while requiring recall of excessive amounts of information.	Not Applicable	No evidence
Spatial Disorientation **(J2)** Type – **SB/RB**	Loss or misjudgment of place or time; wrong component, wrong train and wrong unit errors due to similarities in the environment.	Not Applicable	No evidence

Attachment 6

Human Performance Failure Modes

A = Attentional Issues J = Judgment Issues K = Knowledge Issues

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Mindset / Preconceived Idea **(J3)** Type - **RB**	The tendency of an individual to make a judgment based upon a preconceived mental model or preconditioned bias that is not based upon the current information, conditions or indications.	Applicable	S – ACE performer did not like way CAP was written (1 example from interviews) S – mechanical agitation of SI-9-5 – was decided to perform in the field (RCE review) R – AR screening meeting – AR's held over that members were not sure of or needed more information. Went back to group to get more info.
Wrong Assumptions **(J4)** Type - **RB**	Judgments are made without verification of the facts and are usually based upon the individual's perception of recent experiences or events.	Not Applicable	No evidence
Inadequate Verification **(J5)** Type - **RB**	Insufficient verification of the facts, and is usually based upon inaccurate information or the lack of information.	Not Applicable	No evidence
Inadequate Motivation **(J6)** Type – **SB/RB/KB**	Low morale or low interest in performing well.	Not Applicable	R – all interviews indicate that problem solvers are motivated
Shortcuts Taken **(J7)** Type - **RB**	Actions to allow the job to go "easier" or faster, contrary to prescribed requirements.	Applicable	S – solved immediate issue & didn't go into extent of cause and condition to the depth they should have based on due date. Due date driven drives them to cut it short (D27). S – extent of cause and condition evaluated based on severity level (D27)
Work Around **(J8)** Type - **RB**	Compensatory or non-standard actions to meet a requirement are taken by the worker due to uncorrected material condition, programmatic deficiencies, or long-standing problems.	Not Applicable	S – RCE manual and template disconnected R – RCE manual & template have been revised so they align

Attachment 6

Human Performance Failure Modes

A = Attentional Issues J = Judgment Issues K = Knowledge Issues

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Over Confident **(K1)** Type – **KB/RB/SB**	Underestimating the difficulty or complexity of the task. Self-satisfaction or confidence with a situation in which actual hazards or dangers exist, but the worker is not aware of them.	Not Applicable	No evidence
Unfamiliar or Infrequent Task **(K2)** Type – **KB**	Tasks that have not been performed before or are performed infrequently.	Applicable	S – members of RCE team are not always qualified or proficient to perform RCE. Don't have the required skill set (D27) S – RCE task exceeds the skill set needed to perform the RCE by many of the members assigned to the team (D27).
Misdiagnosis **(K3)** Type - **KB**	Decisions made with accurate information that is used or interpreted incorrectly when reaching a decision.	Not Applicable	No evidence
Tunnel Vision **(K4)** Type - **KB**	Decisions are made without considering all the available options or information needed to adequately assess the situation.	Not Applicable	No evidence
Inadequate Knowledge of Fundamentals **(K5)** Type – **KB**	Insufficient knowledge of fundamentals needed for task, such as heat transfer, fluid flow, structural analysis, etc.	Applicable	S – RCE task exceeds the skill set needed to perform the RCE by many of the members assigned to the team.
Inadequate Knowledge of Standards **(K6)** Type - **KB**	Insufficient knowledge of codes, standards, design basis, licensing basis, regulations, etc. needed to perform the task.	Not Applicable	No evidence

Attachment 6

Human Performance Failure Modes

A = Attentional Issues **J = Judgment Issues** **K = Knowledge Issues**

Failure Mode	Definition	Applicability	Supporting / Refuting Evidence
Flawed Analytical Process or Model **(K7)** Type – **KB/RB**	Decisions based on a flawed analysis, such as using qualitative versus quantitative data, insufficient determination of problem/solution scope, improper computer modeling, or inadequate sample scope.	Not Applicable	No evidence

WHY STAIRCASE

Effect/Symptom

IA-1 *CAP AR initiators are not providing sufficient detail in the action request as required by Section 5.2. (Attachment 13 provides guidance on "sufficient detail")*
[Failure Modes F-2, F-3, F-6, S-3]

1.WHY Initiator is not held accountable to adhere to standard in Attachment 13 by Manager/Supervisor

- **WHY** Managers/Supervisors are not consistently following procedure – Section 5.3
  - **WHY** Do not apply procedure requirement
  - **WHY** Not held accountable by screening process – Section 5.5
  - **WHY** Time pressure
    - **WHY** Should complete the review in 1 day and shall not exceed three working days – Section 5.3 Step 3
  - **WHY** Supervisor/manager does not recognize risks and/or consequences

2. WHY Screening Team is not holding initiator/supervisor accountable to adhere to standard in Attachment 13 by Owed To, Screen Team Chair, or Plant Manager.

- **WHY** Screening Team does not consistently apply procedure requirements – Section 5.3
  - **WHY** Not held accountable to adhere to standard in Attachment 13 by Owed To
  - **WHY** Time pressure
    - **WHY** One day for lead to present to team for review – Section 5.5 Step 3
  - **WHY** Screening Team does not recognize risks and/or consequences

3. WHY Initiator, Supervisor, Screening Team not held accountable to adhere to standard in Attachment 13 by Owed To

- **WHY** Owed to doesn't consistently apply procedure requirement
- **WHY** Not held accountable to adhere to standard in Attachment 13 by Assigned To (pushback)
  - **WHY** Doesn't apply procedure requirement
  - **WHY** Time pressure
  - **WHY** Focusing on next due date
- **WHY** Time Pressure
  - **WHY** Timely completion emphasized by mention of KPI -

Section 5.7 Step 4

WHY Establishing due date outside of default requires more time – analysis of level of effort, priority, justification – Section 5.7 Step 4

WHY Workload

WHY Screening process does not consistently screen out CAPs that do not need to be written – Section 5.2 Step 5

WHY Screening process does not consistently screen out CAPs with similar issues where one can be closed and cross-referenced to the second –Section 5.5 Step 6

WHY Screening process does not consistently screen out CAPs that can be changed to a non-CAP AR Section 5.5 Step 7

IA-1 Contributing Cause – Failure to perform all requirements within the procedure.

Effect/Symptom

IA-2 *Screening Team does not effectively/consistently apply the attributes of a strong nuclear safety culture.*
[Failure Modes F-2, F-3, F-6, S-3]

1. WHY Problems are not fully understood at front end; possible or unknown reduced safety margins not considered, risk and consequences not considered

WHY Problem statements are incomplete, non-specific or cluttered with non-specific data (refer to IA-1)

WHY Screening Team knowledge or diversity LTA

WHY The screening team makeup is not specified in the procedure and is changed at management direction only

WHY CAP Procedure Attachment 8 weak, too many shoulds

WHY Human Behaviors: Time pressure creates brevity

2. WHY Entire Screening Team does not review all information provided with the problem statement

WHY Work Load and Time pressure

WHY Relevance to understanding the problem not recognized

WHY Potential impact on attributes of a strong nuclear safety culture not recognized

IA-2 Root Cause – Management has failed to consistently enforce quality standards and set work priorities based upon procedural requirements and risk / benefit to the plant.

Effect/Symptom

IA-3 *Plant personnel are driven by due date without proper focus on problem solving and resolution.*
[Failure Modes F-3, F-6, RR-4, RR-5, S-3]

WHY Individuals manage work load to prevent late actions

WHY CAs due dates are monitored and therefore prioritized above quality

WHY Easily measurable and self-revealing while ineffective cause and corrective actions are not immediately revealed

WHY Late CAs are easily measured while ineffective solutions and correction are not

WHY Plant focus on raw data and KPIs overrides quality of evaluations and corrective actions

WHY Reduced Safety/Operating margins are not considered

WHY Safety culture model is not clearly pictured or understood at PI

WHY Managers and supervisors are not present in front of their direct reports (eye on the problem)

WHY Integrated site priority matrix nonexistent

IA-3 Root Cause – Management has failed to consistently enforce quality standards and set work priorities based upon procedural requirements and risk / benefit to the plant.

IA-3 Contributing Cause – An integrated site priority matrix that interfaces with other high resource plant processes and programs does not exist.

IA-3 Contributing Cause – There are no highly visible CAP process measures for quality.

Effect/Symptom

IA-4 *Effective corrective actions are not consistently identified, or if identified, are not consistently completed.*
[Failure Modes F-2, F-3, F-6, RR-5]

1. WHY Corrective actions are designed to address symptoms, not cause

WHY Cross-functional problems are not clearly understood by site management

WHY Safety culture model is not clearly pictured or understood at PI

WHY Clear expectations to address multi-functional issues are not well defined and difficult to implement

WHY Safety culture model is not clearly pictured or understood at PI

WHY Managers and supervisors are not present in front of their direct reports (eye on the problem)

2. WHY Individuals are driven by due date without proper focus on problem-solving and resolution [IA-3]

IA-4 Root Cause – Management has failed to consistently enforce quality standards and set work priorities based upon procedural requirements and risk / benefit to the plant.

IA-4 Contributing Cause – An integrated site priority matrix that interfaces with other high resource plant processes and programs does not exist.

IA-4 Contributing Cause – There are no highly visible CAP process measures for quality.

Effect/Symptom

IA-5, *Completed "A' Level actions and "B" level CAP's are not consistently reviewed and are not reviewed in a timely manner.*
[Failure Modes AR-3, AR-4, F-3, F-6, S-3]

1. WHY Passport tracking and cross-referencing poses problems (closeout is a daisy chain)

WHY Focus shifted to due dates from effectiveness

WHY Work load/time management

WHY Safety culture model is not clearly pictured or understood at PI

WHY No integrated Site Priority system that would focus resource time on priorities

WHY No quality measures/KPI

2. WHY "Owed to" CAP review does not occur until all corrective actions are complete

WHY Procedure-driven

WHY Safety culture model is not clearly pictured or understood at PI

WHY No integrated Site Priority system that would focus resource time on priorities.

WHY No quality measures/KPI

3. WHY TRP sample size is not adjusted based on failure rate

WHY Management direction in contradiction to procedure instructions

WHY Work load / time management

WHY Safety culture model is not clearly pictured or understood at PI

WHY No integrated Site Priority system that would focus resource time on priorities

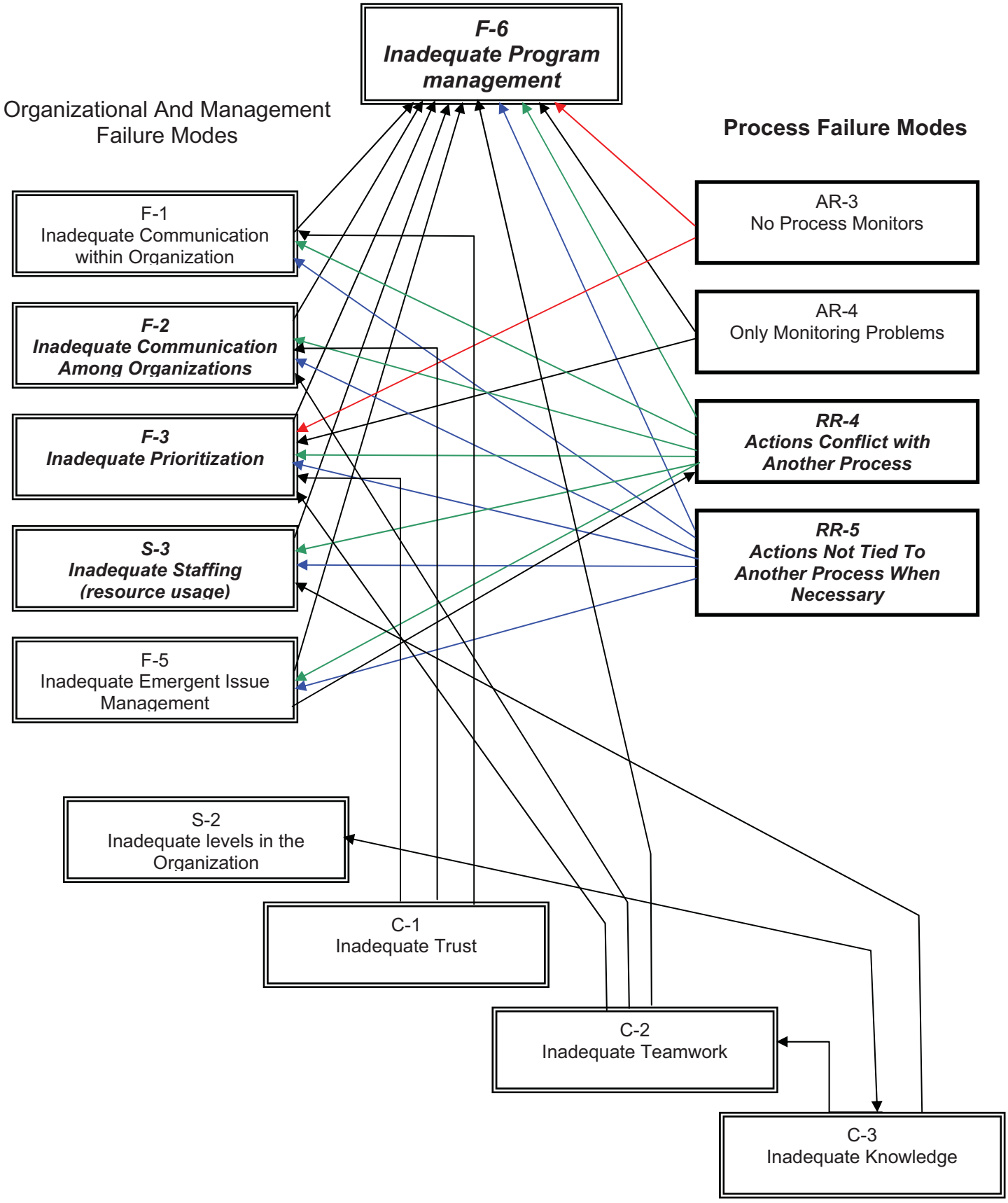
WHY No quality measures/KPI

IA-5 Root Cause – Management has failed to consistently enforce quality standards and set work priorities based upon procedural requirements and risk / benefit to the plant.

IA-5 Contributing Cause – There are no highly visible CAP process measures for quality.

IA-5 Contributing Cause – Failure to perform all requirements within the procedure.

Failure Modes Analysis Diagram



Attachment 9

AR Process Flow Analysis

KEY:

Process flow chart is provided in FP-PA-ARP-01, CAP Action Request Process, Section 5.0, Requirements.

This analysis takes the conclusions from the failure modes analysis, the inappropriate actions from the WHY staircase analysis, safety culture attributes and pictorially represents the process impact point. This evaluation pictorially illustrates the various analysis techniques and identifies the key points of leverage to put PI and PI culture back on track.

Organizational and Management Failures:

F-6, Inadequate Program Management is the primary cause which is induced by three key drivers:

1. F-2, Inadequate Communication among organizations
2. F-3, Inadequate Prioritization
3. S-3, Inadequate Staffing

Additional Failure Modes:

4. F-1, Inadequate communication within organization
5. F-4, inadequate planning
6. F-5, Inadequate emergent issue management
7. C-3, Inadequate knowledge

Process Failures:

F-6, Inadequate Program Management is also driven by process failure as follows:

1. AR 3, No process monitors
2. AR-4 Only monitoring problems
3. RR-4, Actins conflict with another process
4. RR-5, Actions not tied to another process when necessary

RR-4 and RR-5 can be characterized as weakness in the program instruction

Impact on process flow is indicated by RED circles and boxes.

INPO Safety Culture Attributes:

1. Everyone is personally responsible for nuclear safety.
2. Leaders demonstrate commitment to safety.
3. Trust permeates the organization.
4. Decision-making reflects safety first.
5. Nuclear technology is recognized as special and unique.
6. A questioning attitude is cultivated.
7. Organizational learning is embraced.
8. Nuclear safety undergoes constant examination.

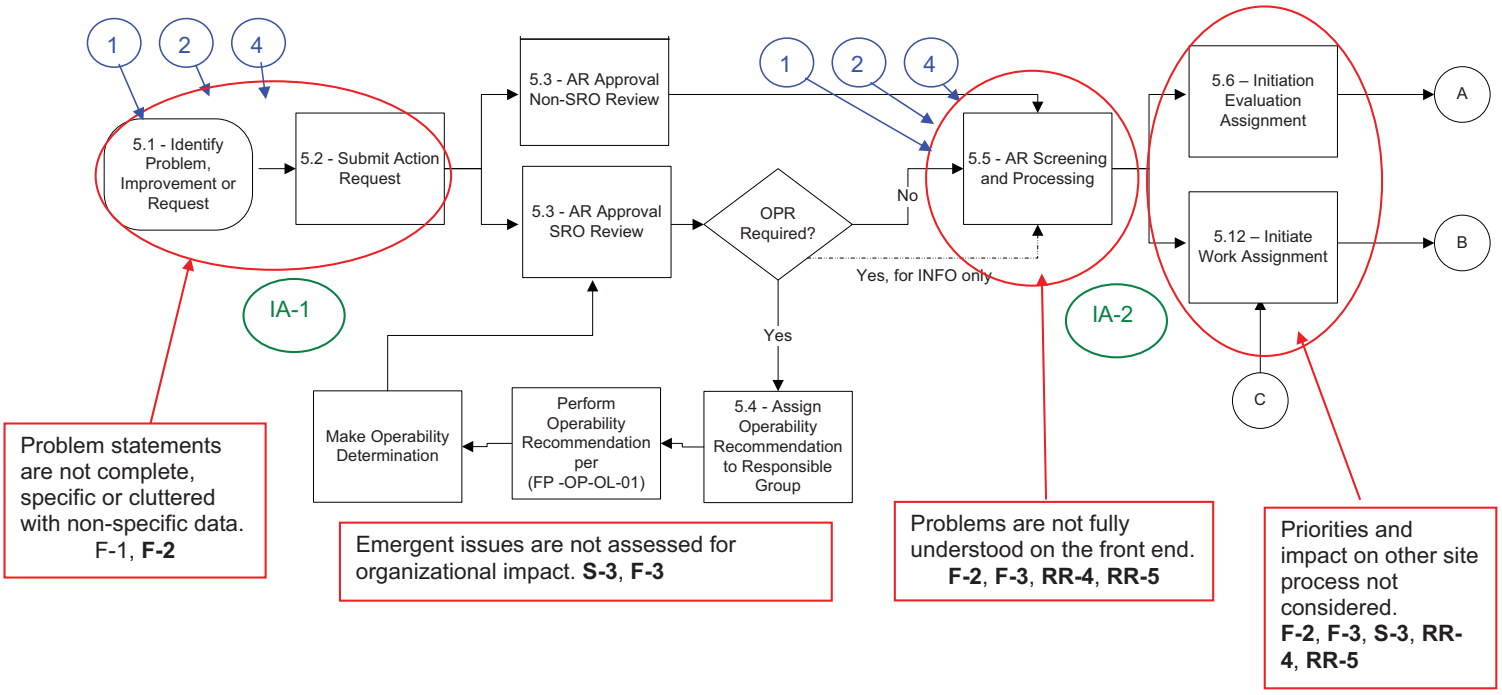
Impact on process flow is indicated by BLUE circle and number.

Inappropriate Actions:

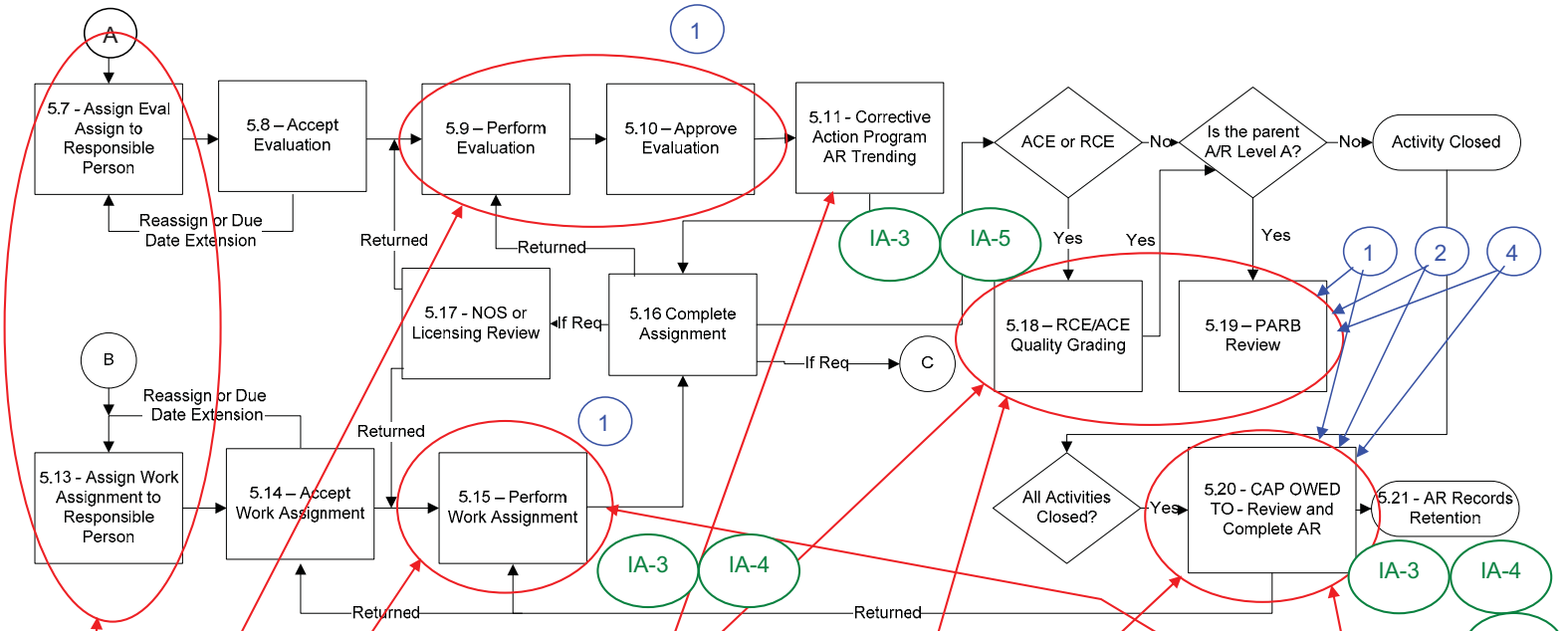
IA-1, CAP AR initiators are not providing sufficient detail in the action request as required by Section 5.2.
IA-2, Screening Team does not effectively/consistently apply the attributes of a strong nuclear safety culture.
IA-3, Plant personnel are driven by due date without proper focus on problem solving and resolution.
IA-4, Effective corrective actions are not consistently identified, or if identified, are not consistently completed.
IA-5, Completed “A’ Level actions and “B” level CAP’s are not consistently reviewed and are not reviewed in a timely manner.

Impact on process flow is indicated by Green circle and IA Number.

AR Process Flow Analysis



AR Process Flow Analysis



Plant personnel are due date driven without proper focus on problem solving and resolution
F-2, **F-3**, F-5, **S-3**, C-3, AR-3, AR-4, **RR-4**, **RR-5**

No quality monitors, only monitoring problems
AR-3, **AR-4**

Effectiveness reviews are missing or untimely.
F-3, F-5, **S-3**, C-3, AR-3, AR-4, **RR-4**, **RR-5**

Necessary corrective actions are not being taken.
F-3, F-5, **S-3**, C-3, AR-3, AR-4, **RR-4**, **RR-5**

Priorities and impact on other site process not considered.
F-2, **F-3**, **S-3**, **RR-4**, **RR-5**

RCE Action Review Summary

RCE CAPR 01013473-37 closed to CA 01059041-21 then closed to CAPR 01013473-37 with no action taken.

RCE CAPR 01013473-09 initial training and periodic refresher training shows no evidence of periodic refresher training being implemented

RCE CAPR 01013473-10 develop and present a case study completed, no study actually done as evidenced by questions presented but not answered, and no further action taken.

RCE CAPR 01013473-36 no evidence in report benchmarked with industry standards

RCE CAPR 01013473-38 notes say EFR called ineffective, but Sharepoint report doesn't identify by EFR or CAPR number additional actions and effective reviews. No way to easily determine if actions and effectiveness reviews were completed.

RCE CAPR 01013473-42 notes say EFR called ineffective, but EFR report in Sharepoint says effective.

RCE CAPR 01013473-11 changes indicators to balance quality and timeliness so that completion of CAPRs not due-date, but quality driven. EFR for this issue states "The conclusion of this effectiveness review is that the actions completed were effective in addressing the problem described above, but there is still additional work needed by Management to actively discuss quality of CAP action completion over due dates. A copy of this effectiveness review will be provided to the Director of Engineering for use in discussing CAP action quality and due dates in Engineering Supervisor and Engineer All-Hands meetings." A follow up EFR appears to have been warranted, but not issued.

RCE CAPR 01013473-12 changes CAP extension requirements. EFR for this issue states "The conclusion of this effectiveness review is that the actions completed were effective in addressing the problem described above, but there is still additional work needed by Management to actively discuss quality of CAP action completion over due dates. A copy of this effectiveness review will be provided to the Director of Engineering for use in discussing CAP action quality and due dates in Engineering Supervisor and Engineer All-Hands meetings." A follow up EFR appears to have been warranted, but not issued.

RCE CAPR 01013473-05 develop and implement an Equipment Trending Program status complete, with notes that this trending program exists. Either RCE evaluation missed this or assignment did not clearly specify a desired improvement in trending program, or some other disconnect.

RCE CAPR 01013473-08 creates TRP, was effective on A actions, directed later to focus more on C CAPs, no procedural direction to refocus on A actions should they degrade.

RCE CAPR 01099775-03 action is to define clear expectations and consequences for HRA, LHRA, and VHRA violations. Procedure changed to define clear consequences, but no indication that any action was taken to define clear expectations.

RCE CAPR 01099775-04 to increase observations was implemented by procedure change, completed November 2007. RCE CAPR 01099775-10 proposed to and agreed to by PARB to "delete" CAPR 01099775-04 October 2008.

RCE CAPR 01099775-09 EFR deemed effective despite evidence in the report refuting this.

Procedure Review Barrier Analysis

Barrier – Procedure Use and Adherence

FP-PA-ARP-01, Revision 21

- Initiator doesn't provide sufficient detail in CAP AR – Section 5.2 Step 2 and Attachment 13
- Screening process does not screen out CAPs that do not need to be written – Section 5.2 Step 5
- Procedure states "should complete the review in 1 day and shall not exceed three working days" – Section 5.3 Step 3a, drives inappropriate results.
- Initiator's Manager/Supervisor doesn't insure sufficient detail in CAP AR – Section 5.3 Step 3b and Attachment 13
- Screening process doesn't insure sufficient detail in CAP AR – Section 5.5 Step 2 and Attachment 13
- One day for CAP lead to present team for review – Section 5.5 Step 3, drives inappropriate results.
- Screening process does not screen out CAPs with similar issues where one can be closed and cross-referenced to the second –Section 5.5 Step 6
- Screening process does not screen out CAPs that can be changed to a non-CAP AR Section 5.5 Step 7
- Owed To doesn't insure sufficient detail in CAP AR – Attachment 13 and Section 5.6 (Level A CAP ARs); Section 5.7 Step 1 doesn't make this responsibility clear
- Procedure does not clearly state what function is responsible for writing the evaluation assignment statement – Section 5.5, 5.6, 5.7
- Establishing initial due date outside of default requires more time – analysis of level of effort, priority, justification – Section 5.7 Step 4, drives inappropriate results.
- Assigned To doesn't insure sufficient detail in CAP AR – Attachment 13 and Section 5.8 Step 1
- Assigned To doesn't determine immediately whether the assignment can be completed by the due date Section 5.8 Step 1
- Attachment 9 is only referenced in step Section 5.10, but includes information relevant to multiple other steps
- Left column doesn't identify Responsible Individual(s) – Section 5.10

- Establishing initial due date outside of default requires more time – analysis of level of effort, priority, justification – Section 5.13 Step 3, drives inappropriate results.
- Assigned To doesn't determine immediately whether the assignment can be completed by the due date Section 5.14 Step 1
- Owed to does not consistently insure issue has been properly resolved – Section 5.20 Step 1 and Attachment 9
- Screening charter states "determine the level of effort". Could be clarified to state meaning of that phrase – determine if RCE, ACE, CE, or CA is needed.
- Screening charter states "consideration should be given to using multi-discipline teams in performing evaluations of issues affecting multiple organizations." This is not limited to RCEs, and there is no evidence multi-disciplinary teams are considered except for RCEs – Attachment 8
- Screening team doesn't consistently add note for all "A" CAPs identifying SCAQ or not, CAPRs, EFRs required – Attachment 8
- Screening team does not consistently identify if feedback to Originator is needed – Attachment 8
- Composition of screening team allows minimum quorum (shall) that may not include representatives from appropriate departments (should) – Attachment 8
- CAP ARs are not consistently reviewed within 30 days of completion – Attachment 9
- Technical Review Panel is not performing of reviews of scope of CAPs defined in charter – Attachment 10
- Results of Technical Review Panel reviews are a measure of quality of CAP actions, but these results are not a KPI or published to the site – Attachment 10
- "Established standards of quality" for review and approval of evaluations and corrective actions are not established, known, enforced – Attachment 13
- Attachment 14 allows for CAP assignments to be excluded from CAP Performance Indicators, removing visibility to site

Result:

- Inadequate problem statements
- Time pressure
- Inadequate evaluations and actions
- Workload increase
- Focusing on next due date